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FLOOD HAZARD ANALYSES PASSUMPSIC RIVER

Lyndon, Vermont



"1927 flood at St. Johnsbury Center, from 'Lights and Shadows of the Flood of 1927' by Charles T. Walters and Zenas C. Jenks."

Prepared for
VERMONT DEPARTMENT OF WATER RESOURCES
By the
UNITED STATES DEPARTMENT OF AGRICULTURE
✓ SOIL CONSERVATION SERVICE
Assisting the
CALEDONIA NATURAL RESOURCES CONSERVATION DISTRICT

January 1973

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Washington, D. C. 20250

SUBJECT: RB - Flood Hazard Analyses
Passumpsic River, Vermont

DATE: JUL 13 1973

To: Acquis.
for
Collection

TO: Joseph F. Caponio
Acting Director
National Agricultural Library

A copy of the recently completed Flood Hazard Analyses Report "Passumpsic River, Lyndon, Vermont" is attached for your information. This report was prepared at the request of the Vermont Department of Water Resources in cooperation with the local governments involved. The study was carried out under the authority of Section 6 of Public Law 83-566, in accordance with House Document No. 465, 89th Congress, 2d Session, especially Recommendation 9(c), "Regulation of Land Use."

The purpose of the report is to make flood hazard and land use information readily available to State and local governments, interested agencies, organizations, and citizens, to encourage land use appropriate to the degree of hazard involved.

The Soil Conservation Service's objective in furnishing this technical data is to help reduce present and potential flood damages through wise utilization of flood plain lands, thereby improving the health, safety, economy, and environmental conditions of the community.

William B. Davey

Acting

Kenneth E. Grant
Administrator

Attachment



Mr. J. Edgar Hoover
Department of Justice

Joseph E. Ransome
Acting Director
National Agricultural Library

A copy of the recently completed Soil Conservation Service report "Conservation of Soil Resources" is being furnished to you for information. This report was prepared at the request of the National Academy of Sciences and is concerned with the conservation of soil resources. The report was prepared by the National Academy of Sciences, 1200 Pennsylvania Avenue, N.W., Washington, D.C. 20004. The report is being furnished to you for information.

The report is being furnished to you for information. The report is being furnished to you for information. The report is being furnished to you for information.

Very truly yours,
Joseph E. Ransome

Acting Director
National Agricultural Library

Enclosure



FOREWORD

This report identifies and delineates flood hazard areas along the Passumpsic River and its tributaries in Lyndon, Vermont. It is intended for use by governmental planning and legislative groups in formulating land use policy, adopting and enforcing land use regulations, and providing public information.

The report was prepared by the Soil Conservation Service, U.S. Department of Agriculture, Burlington, Vermont, in cooperation with the Vermont Department of Water Resources, under the authority of Section 6, PL 83-566, in accordance with Recommendation 9(c) of House Document No. 465, 89th Congress, and Executive Order 11296. The Department of Water Resources, under Chapter 34, Title 10, of the Vermont Statutes Annotated, is responsible for carrying out studies relating to the use, development and protection of the State's water resources.

The report provides the best current estimates of floodwater elevations and areas inundated under present conditions for the ten, twenty, and one hundred year frequency floods. For comparative purposes, high water marks experienced during the 1927 flood are also shown.

Appreciation is expressed for the assistance of local agencies and to property owners who cooperated with survey work connected with the study.

U. S. DEPT. OF AGRICULTURE
NATION

JUN 21 1974

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FLOOD HAZARD ANALYSES

PASSUMPSIC RIVER

Lyndon, Vermont

Introduction

The maps and profiles included in this report, in presenting the best current estimate of flood hazard, provide an initial step in the development of a comprehensive floodplain management program. These delineations can serve as a basis for land use and development control as a principal means of limiting flood losses.

Recently, emphasis has been placed on the use of non-structural methods of floodplain management, such as zoning, floodproofing, and flood warning. Although structural measures such as flood control dams are required under certain conditions, control of floodplain development would appear to be an effective method of minimizing flood losses in the study area. Authorities are available for floodplain zoning through state enabling legislation (Chapter 91 of the Vermont Statutes Annotated, Planning and Development Act of 1968).

Recommendations concerning legal aspects and methods of implementing a floodplain management program are not within the scope of this report.

Various information brochures on floodplain management have been published by the U.S. Corps of Engineers. Information and technical assistances available through the Vermont Department of Water Resources, and soil and water resources information useful for planning can be provided by the Soil Conservation Service. "Regulation of Flood Hazard Areas to Reduce Flood Losses" published by the Water Resources Council and available through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, provides comprehensive coverage of the subject.

The Vermont Department of Water Resources, and the Soil Conservation Service, U.S. Department of Agriculture, will provide technical assistance in the interpretation and use of information developed in this study. Requests may be addressed to:

U.S. Department of Agriculture
Soil Conservation Service
96 College Street
Burlington, Vermont 05401

or, Agency of Environmental Conservation
Vermont Department of Water Resources
Montpelier, Vermont 05602

Procedures and Techniques

Flood runoff volumes and flows were developed on the basis of stream hydraulics, soil cover, land use, and rainfall data. Cross-section surveys of the stream channel and valley were used to determine water surface profiles for various flows; flood hydrographs for the ten, twenty, one hundred year and 1927 floods were then developed and routed through the watershed using computer programs prepared for this purpose. The resulting computer printout of water level at surveyed sections, to the nearest 0.1 foot, for each of the four floods, was used to prepare flood profiles and approximate plan views of the flooded areas. Frequency analyses indicated that the 1927 flood, occurring under present conditions, would be essentially identical to the 100 year flood, and therefore was not delineated separately on the maps and profiles. Actual flood elevations experienced in 1927 were taken from U.S. Corps of Engineers data and plotted at selected locations on the profiles.

Topographic data available included manuscript copies of 1"=200' photogrammetric maps with five foot contour intervals provided by the Vermont Highway Department. These maps, together with cross-section survey data, stereoscopic study, and field checks, were used to delineate the approximate extent of flooding in plan view on the included aerial photograph enlargements. Enlargements were made from 1962 1"=1500' aerial photography.

Computed flood discharges were compared for consistency with U.S. Corps of Engineers analyses at the downstream end of the study area, and with limited stream gauge data available within the watershed. Peak stream discharge at the Pierce Mills dam during the 1927 flood together with weather bureau records of rainfall distribution were available for simulating the 1927 flood hydrograph.

Engineering survey data and computations were organized to allow future reference and use as needed, and are on file with the Department of Water Resources.

Flood Delineations

The study results following are in the form of aerial photo plan views of the floodplain, with expected floodwater profiles plotted on the lower part of the sheets. Due to variations in relief, the edges of the flood hazard areas outlined are approximate. In order to accurately determine the flood hazard at a point near the edge of the floodplain, the user can locate the point on the map, and read the expected floodwater elevation from the corresponding location on the profile. The safety of the location can then be determined by inspection, or if necessary, by surveying its mean sea level elevation.

The elevations shown by the profiles could be used to establish monumented flood area boundaries, if desirable under administrative controls adopted.

Flood hazard was not determined in tributary areas where it appeared that development potential is low, or, as in the upper reaches, flood-plains are relatively narrow. However, consideration should be given to controlling areas of reasonable extent along these tributaries.

The flood profiles given should be considered minimums, since the effects of ice and debris on flood levels cannot be accurately predicted.

Major changes of bridge openings, valley cross-sections, or dam spillways will affect flood levels and necessitate updating the information given by this report. Additionally, major changes in land use and cover due to accelerated development, although not expected in the near future, could cause a significant change in flood levels.



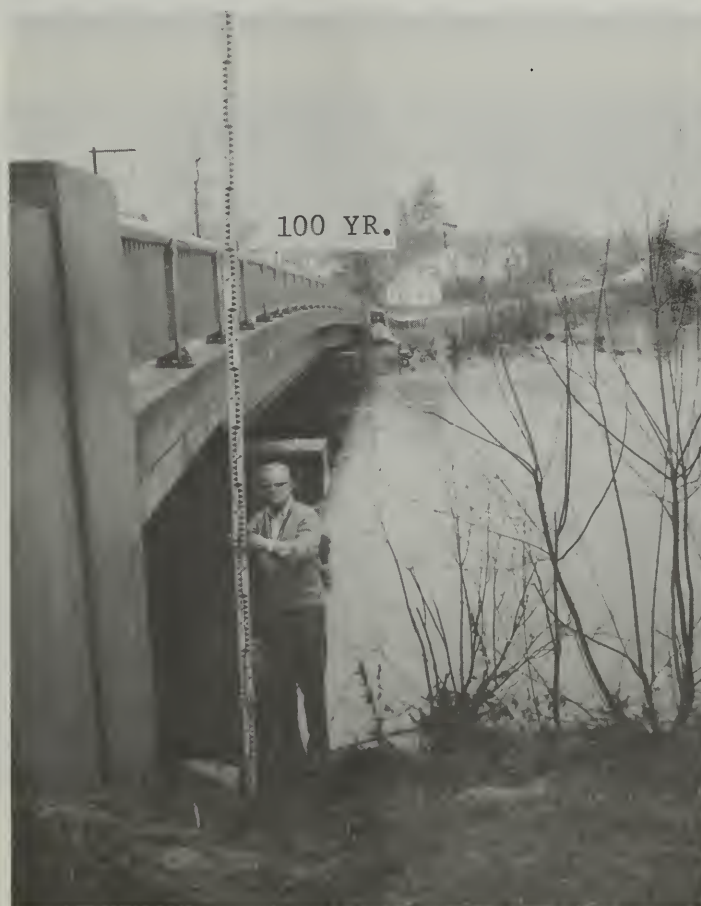
Bridge over Wheelock Branch at Lyndon
(Cross-Section W4)



Southwest corner of Lyndonville Graded School
(Cross-Section 37)



Bridge over East Branch, Vermont
Route 114 (Cross-Section 23)



Bridge over Passumpsic River, Vermont
Route 122 at Lyndonville
(Cross-Section 38)



Crest of Lyndonville Electric Company dam
(Cross-Section 56)



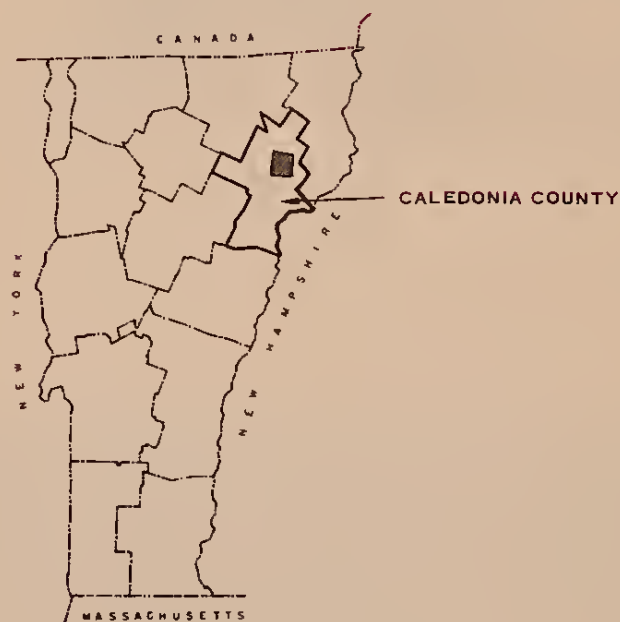
Bridge over Miller Run
(Cross-Section M7)



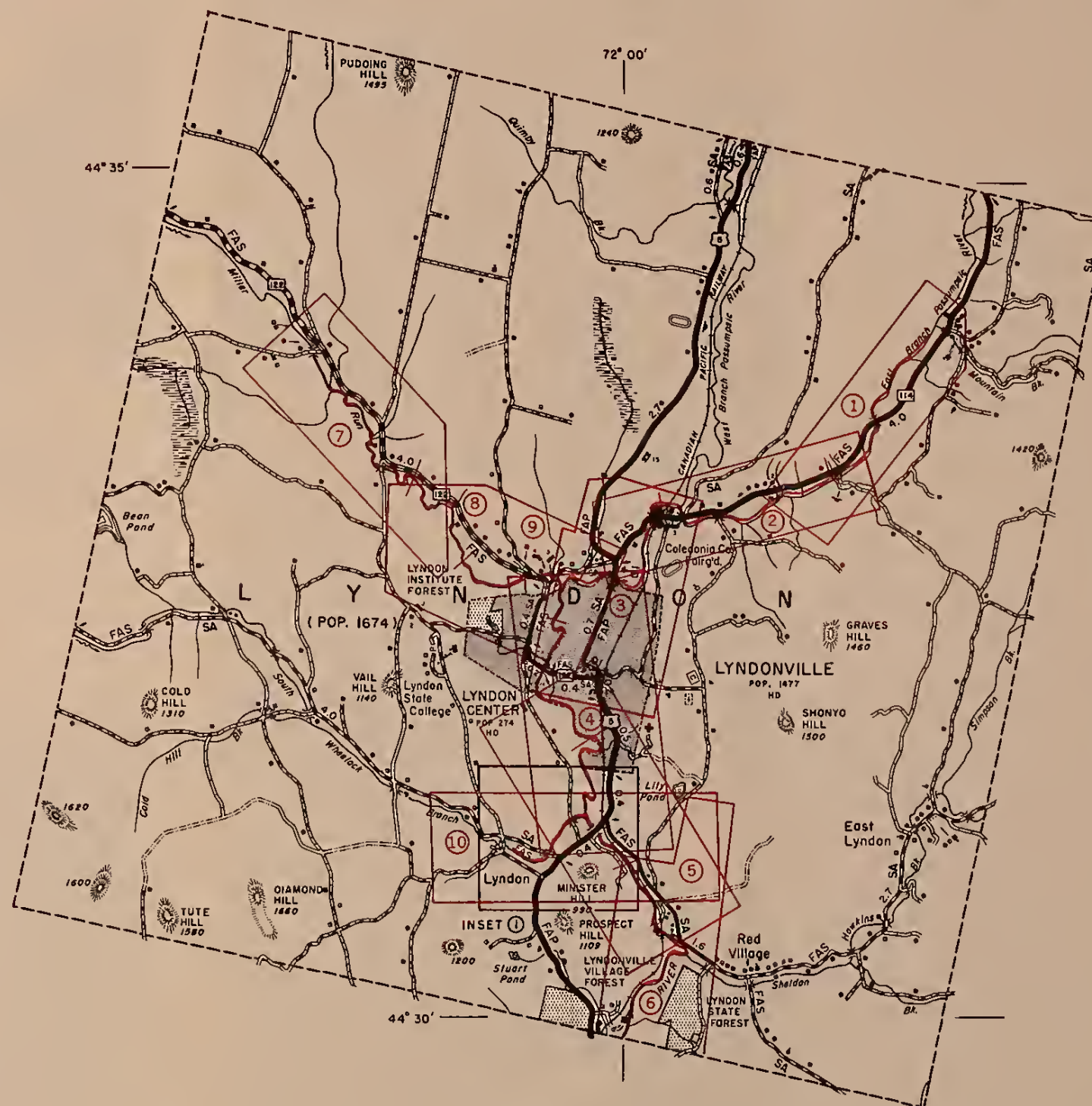
Bridge over East Branch
(Cross-Section 18)

LEGEND

STREAM
POND OR LAKE
TOWN LINE
STUDY AREAS
RED OUTLINE INDICATES
SHEET COVERAGE
WITH MATCH LINE



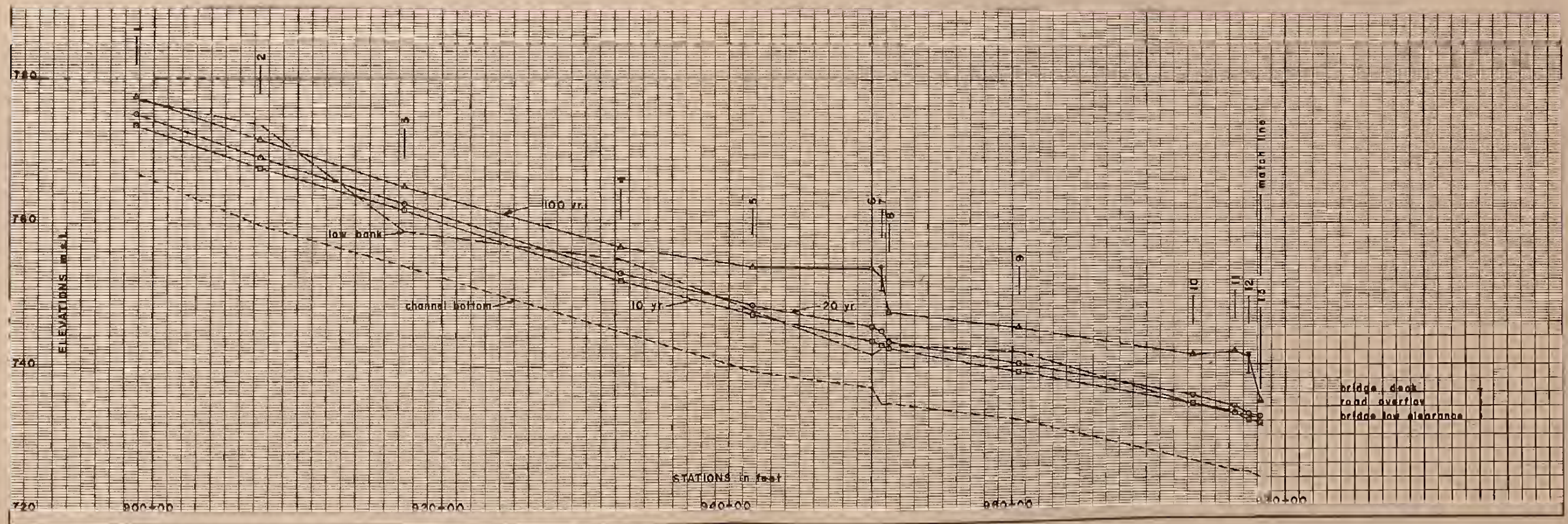
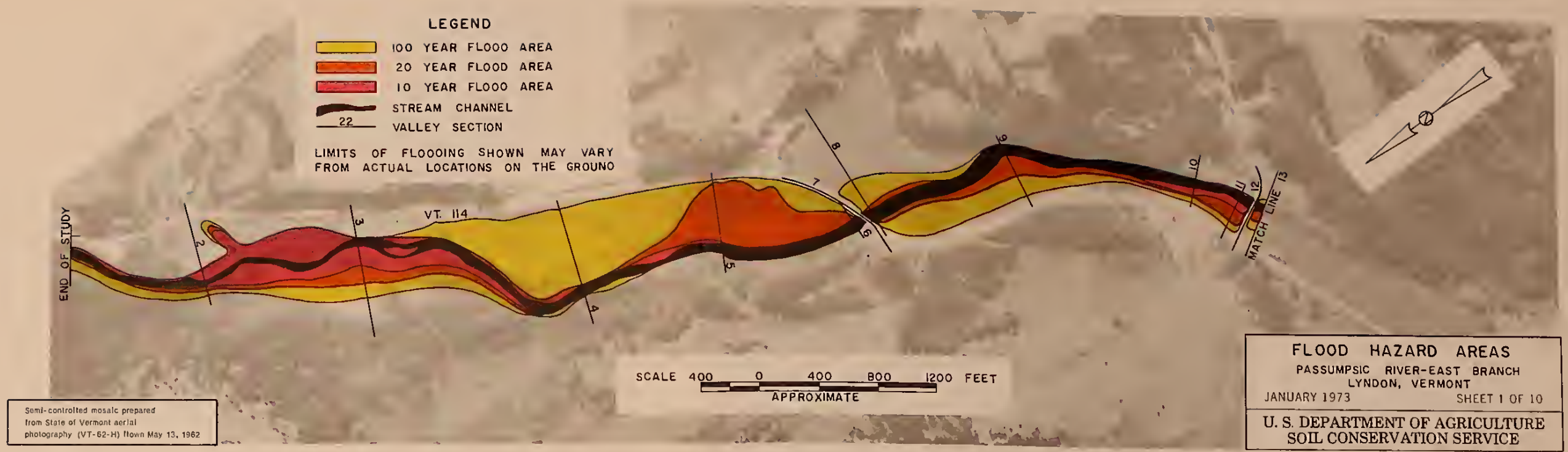
KEY TO LOCATION IN VERMONT



STUDY AREA AND INDEX TO FLOOD HAZARD AREA MAPS PASSUMPSIC RIVER LYNDON, VERMONT

SOURCE: Caledonia (1961) County Highway Map

JANUARY 1973

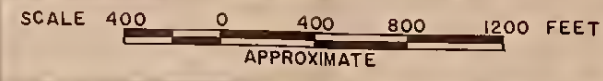


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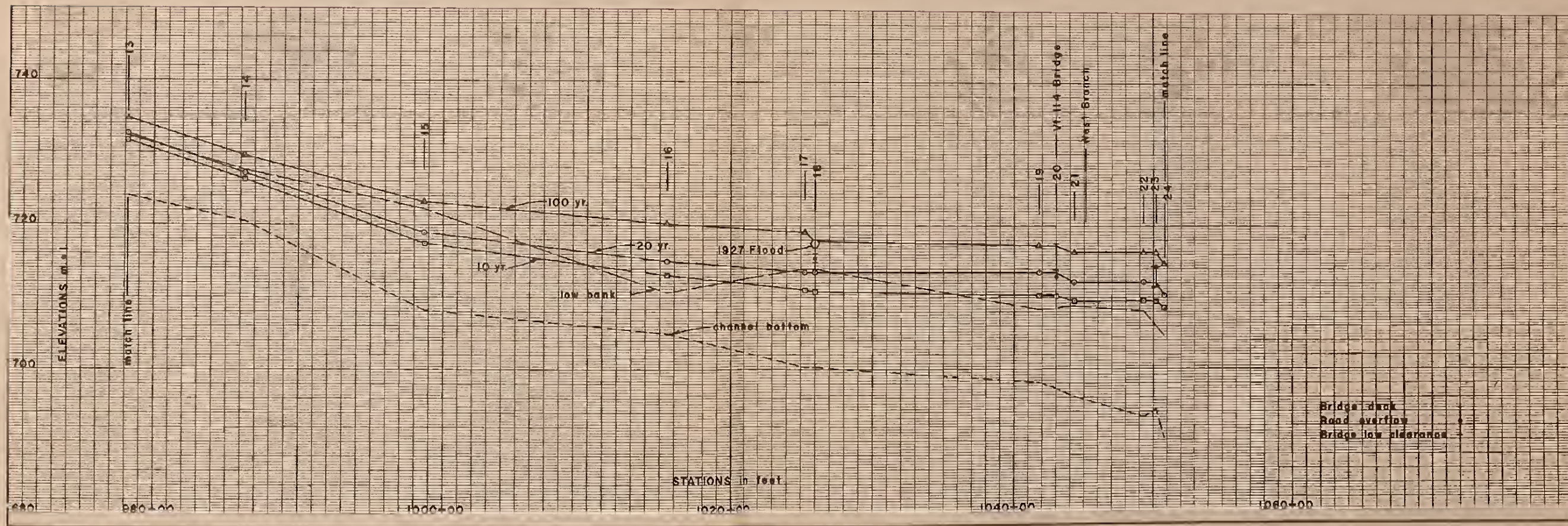
- 100 YEAR FLOOD AREA
- 20 YEAR FLOOD AREA
- 10 YEAR FLOOD AREA
- STREAM CHANNEL
- 22 VALLEY SECTION

LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND

Semi-controlled mosaic prepared from State of Vermont aerial photography (VT-62-H) flown May 13, 1962



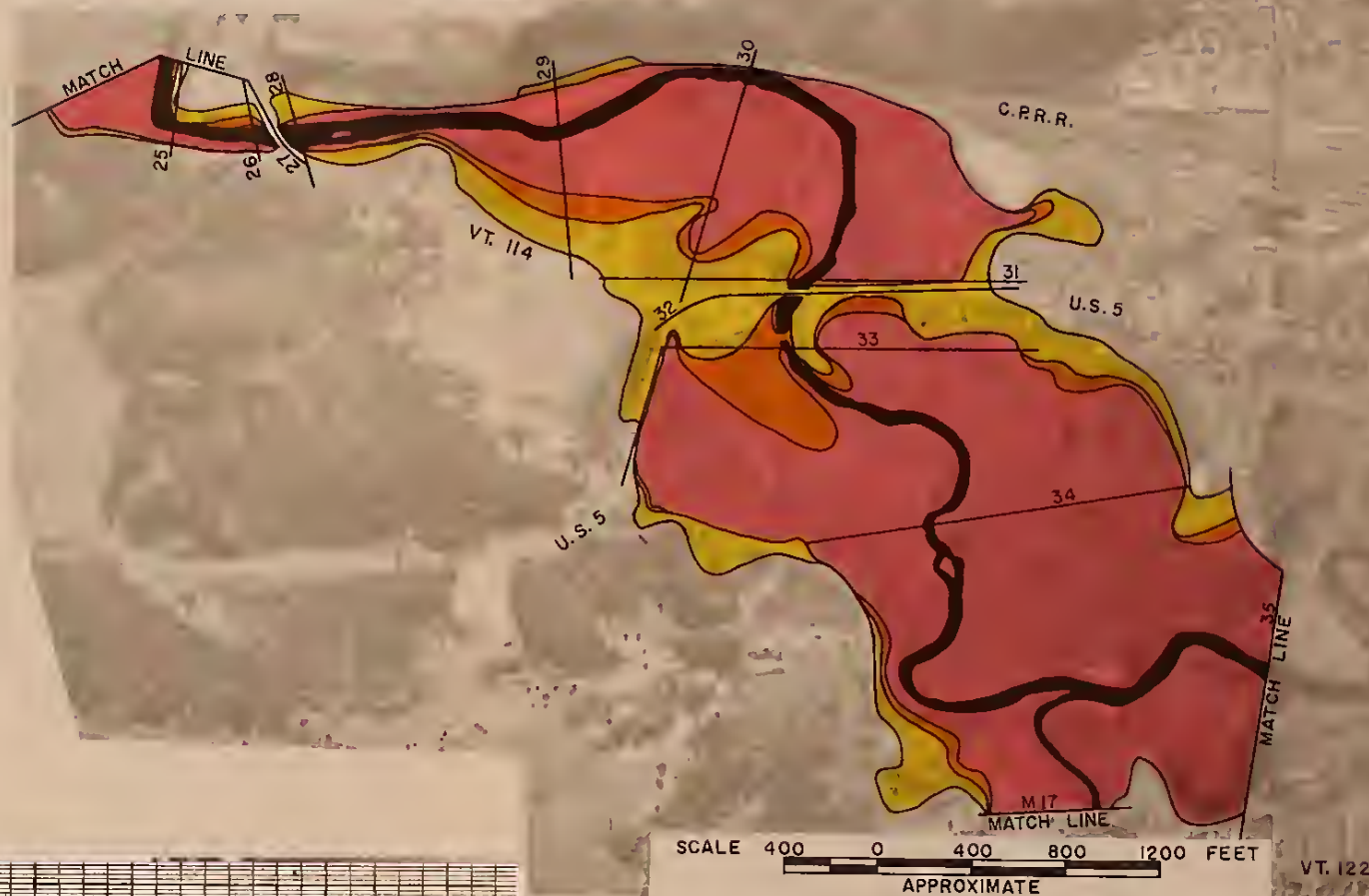
FLOOD HAZARD AREAS
 PASSUMPSIC RIVER-EAST BRANCH
 LYNOON, VERMONT
 JANUARY 1973 SHEET 2 OF 10
 U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE



LEGEND

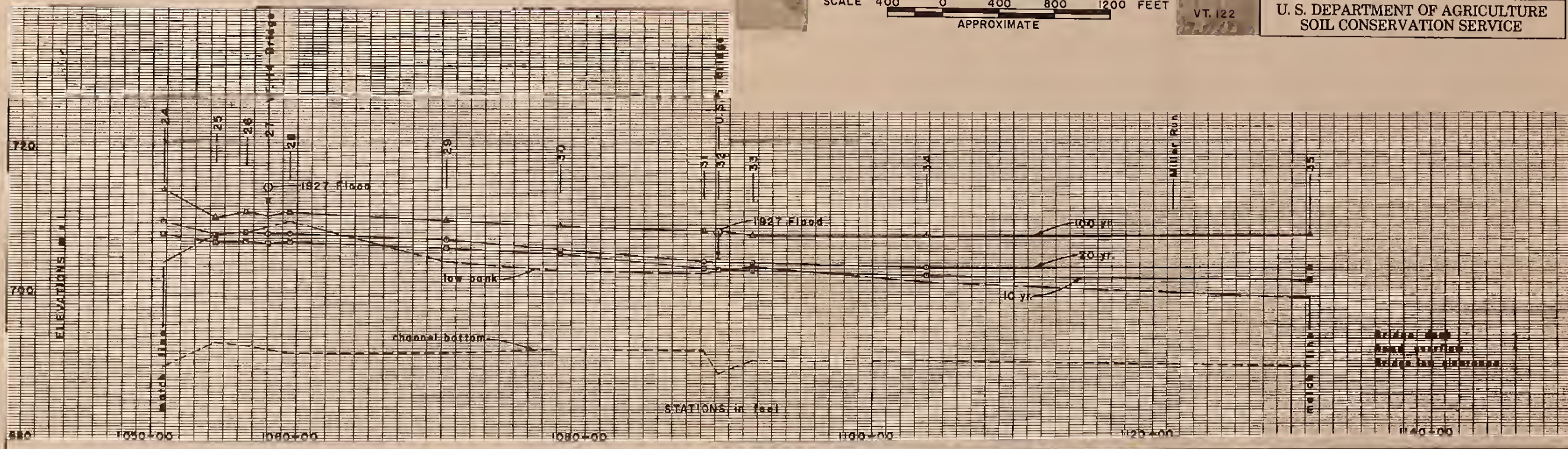
- 100 YEAR FLOOD AREA
- 20 YEAR FLOOD AREA
- 10 YEAR FLOOD AREA
- STREAM CHANNEL
- 22 VALLEY SECTION

LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND

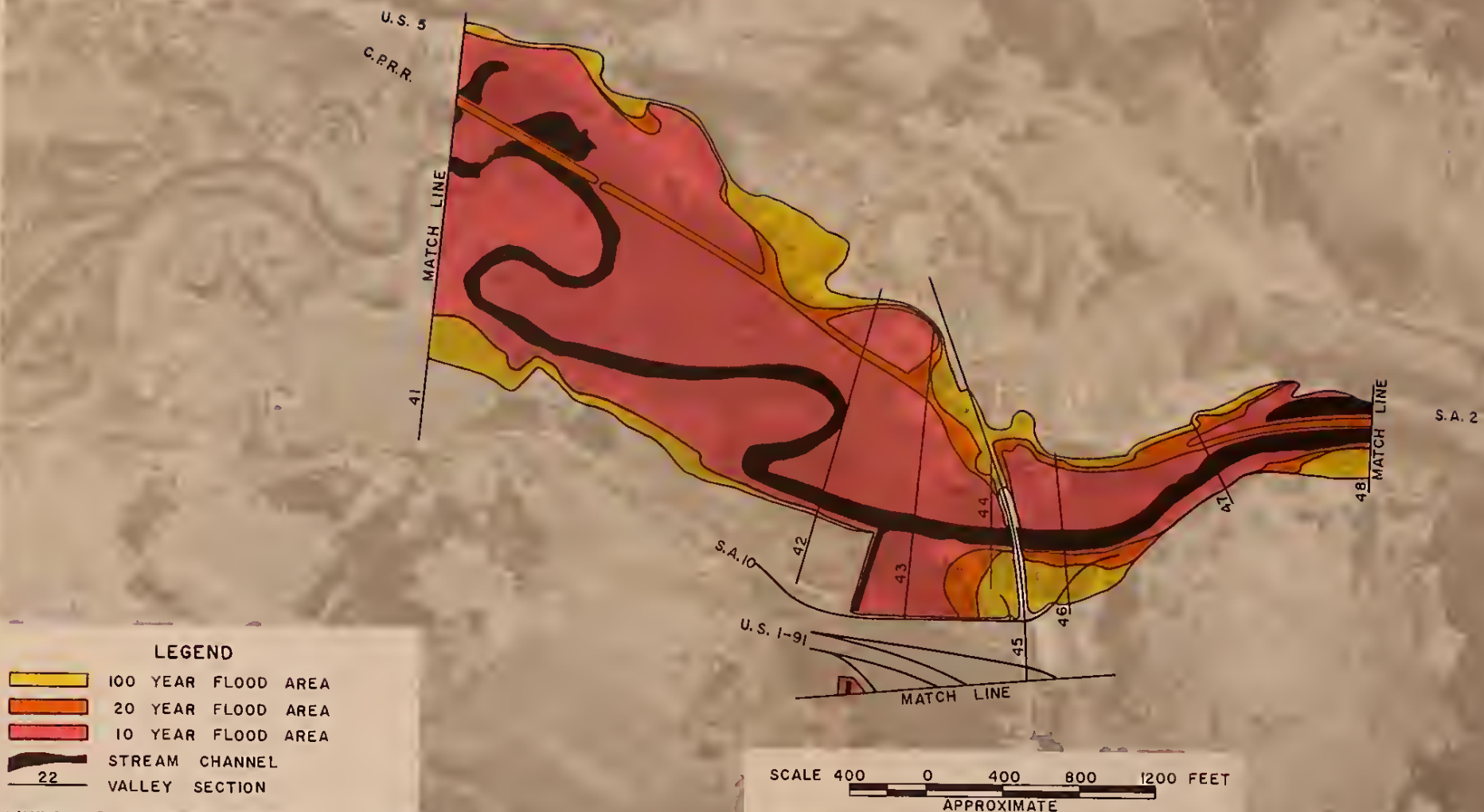


Semi-controlled mosaic prepared
from State of Vermont aerial
photography (VT-62-H) flown May 13, 1962

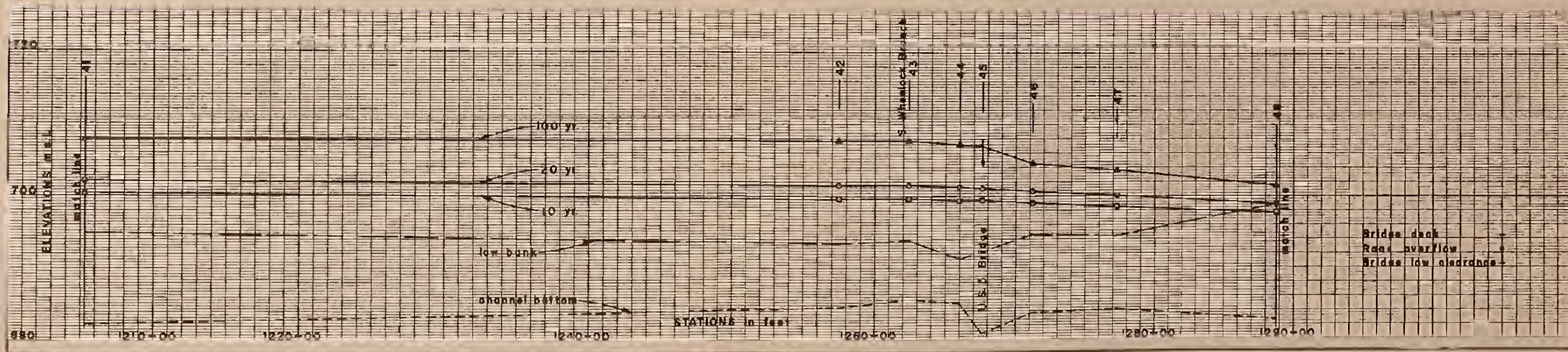
FLOOD HAZARD AREAS
PASSUMPSIC RIVER
LYNDON, VERMONT
JANUARY 1973 SHEET 3 OF 10
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



Semi-controlled mosaic prepared
from State of Vermont aerial
photography (VT-62-H) flown May 13, 1962



FLOOD HAZARD AREAS
PASSUMPSIC RIVER
LYNDON, VERMONT
JANUARY 1973 SHEET 5 OF 10
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SOIL CONSERVATION SERVICE

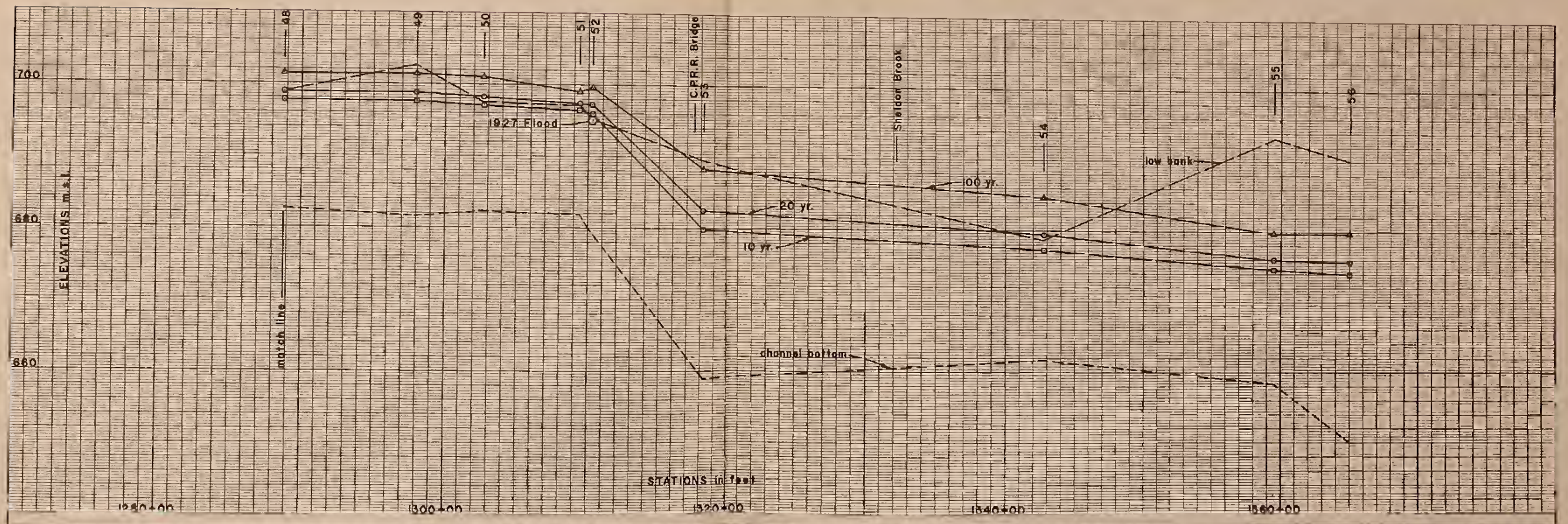
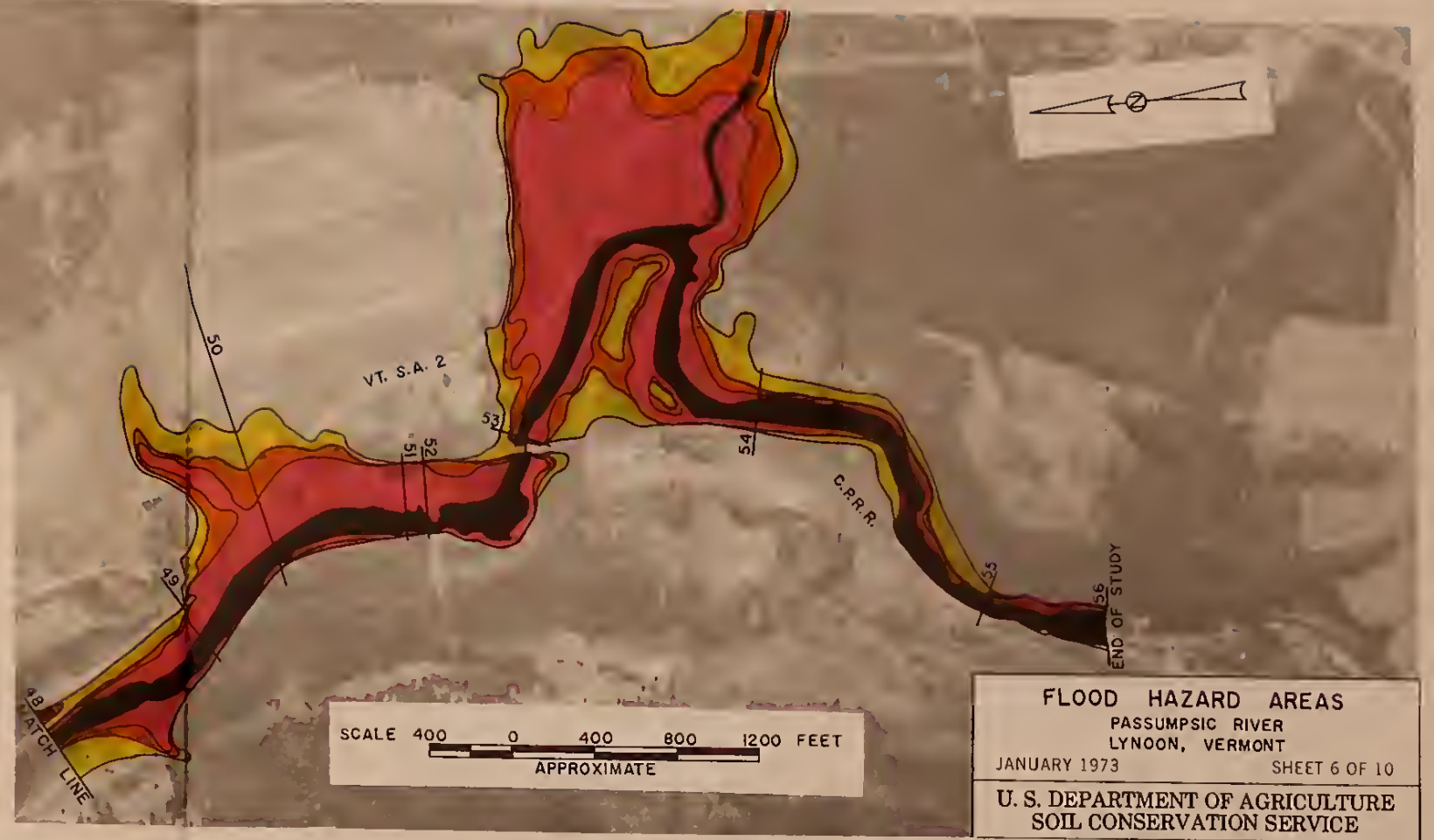


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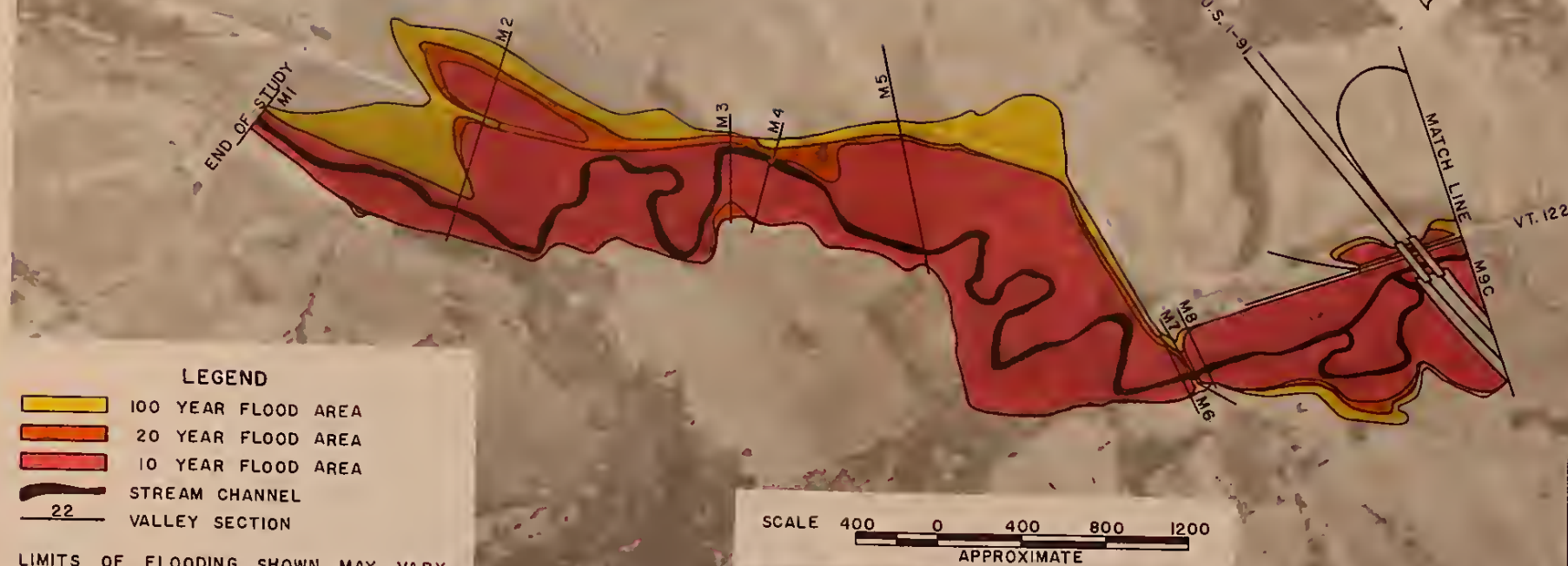
100 YEAR FLOOD AREA
 20 YEAR FLOOD AREA
 10 YEAR FLOOD AREA
 STREAM CHANNEL
 22 VALLEY SECTION

LIMITS OF FLOODING SHOWN MAY VARY
 FROM ACTUAL LOCATIONS ON THE GROUND

Semi-controlled mosaic prepared
 from State of Vermont aerial
 photography (VT-62-H) flown May 13, 1962



Semi-controlled mosaic prepared
from State of Vermont aerial
photography (VT-62-H) flown May 24, 1963



LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND

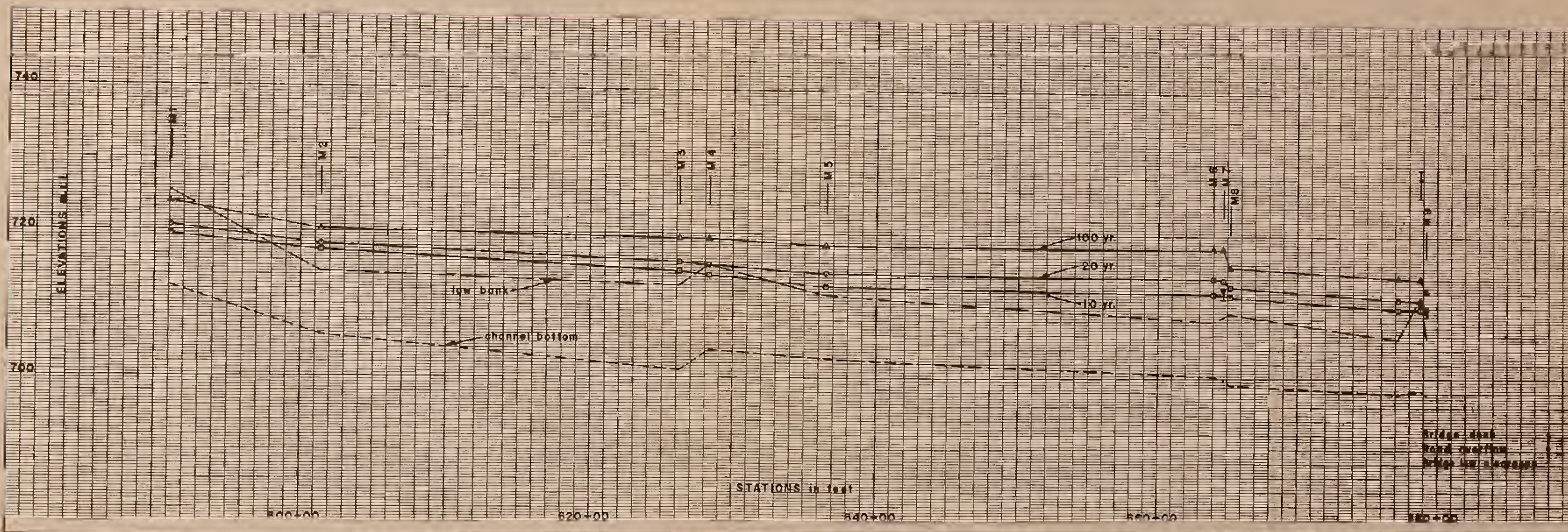
FLOOD HAZARD AREAS

MILLER RUN
LYNDON, VERMONT

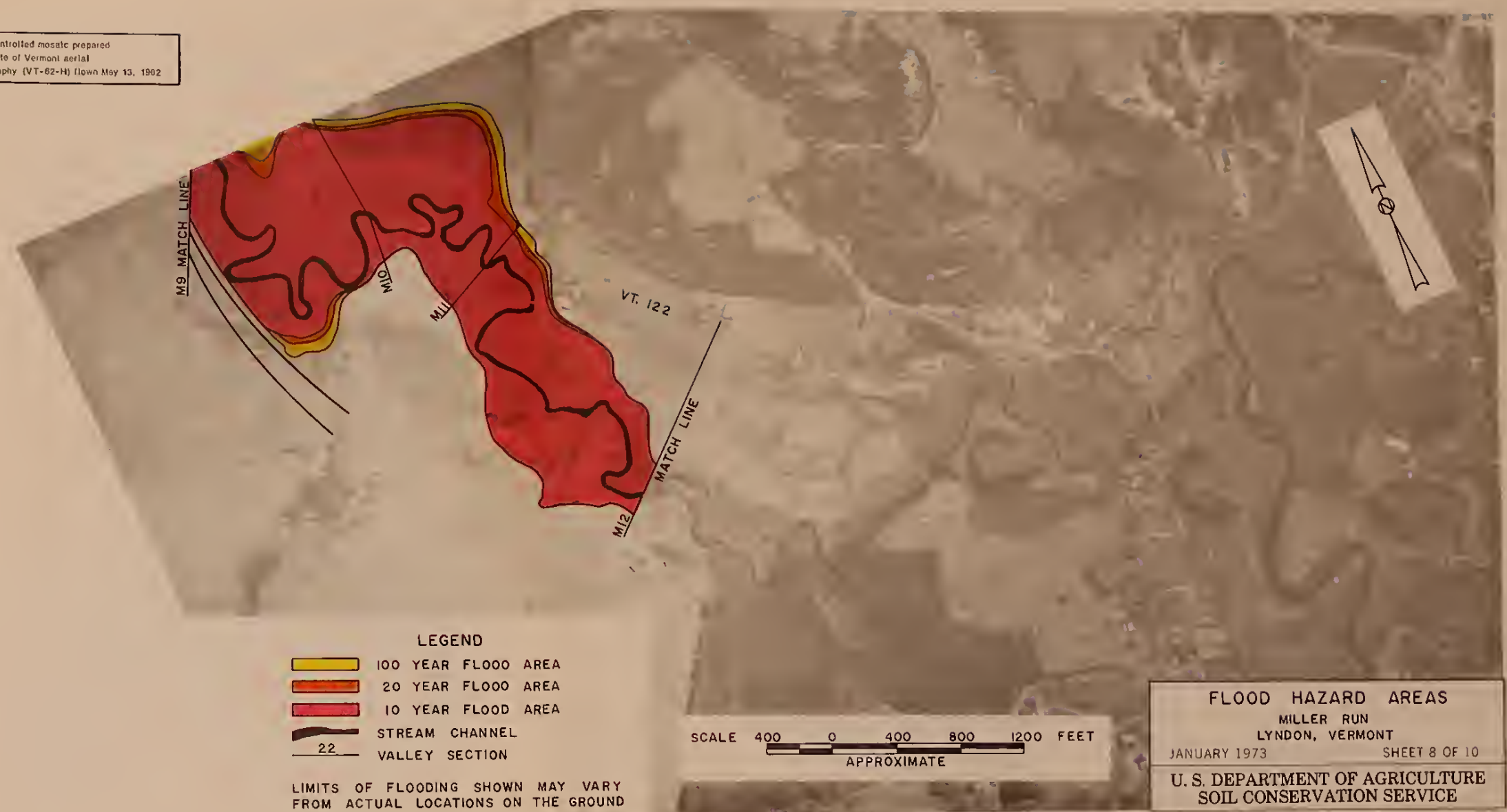
JANUARY 1973

SHEET 7 OF 10

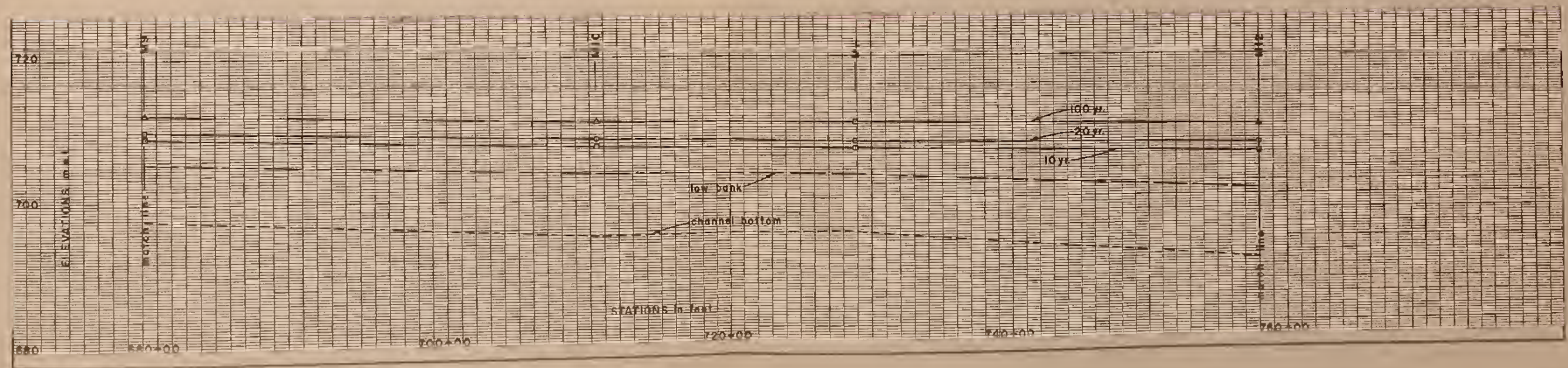
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



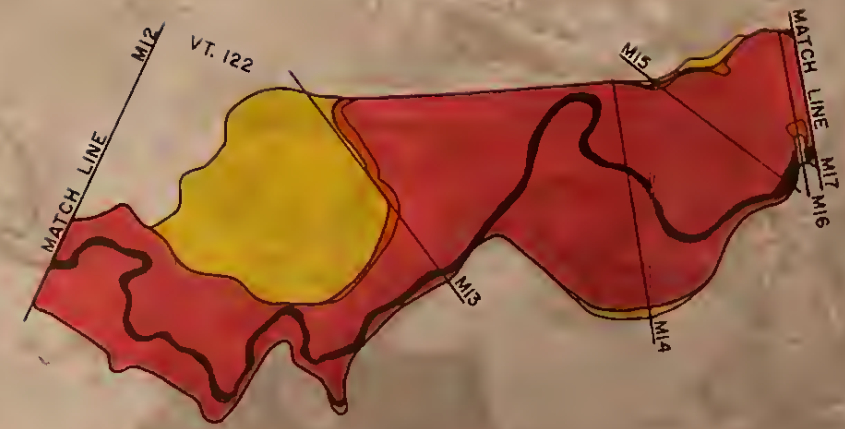
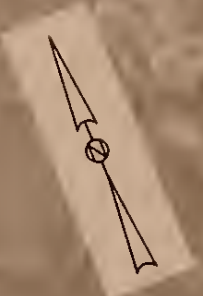
Semi-controlled mosaic prepared
from State of Vermont aerial
photography (VT-62-H) flown May 13, 1962



LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND



Semi-controlled mosaic prepared
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photography (VT-62-H) flown May 13, 1962

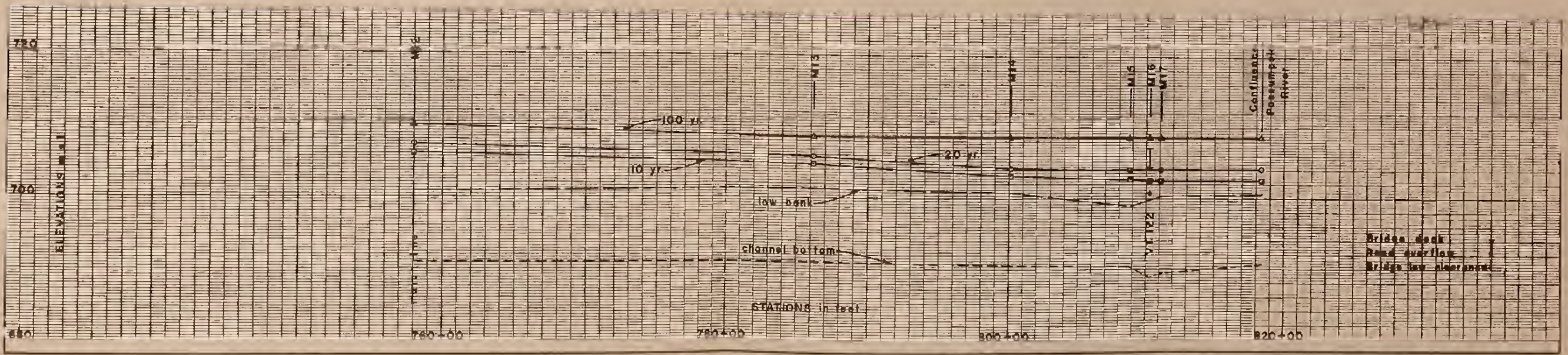


- LEGEND**
- 100 YEAR FLOOD AREA
 - 20 YEAR FLOOD AREA
 - 10 YEAR FLOOD AREA
 - STREAM CHANNEL
 - 22 VALLEY SECTION

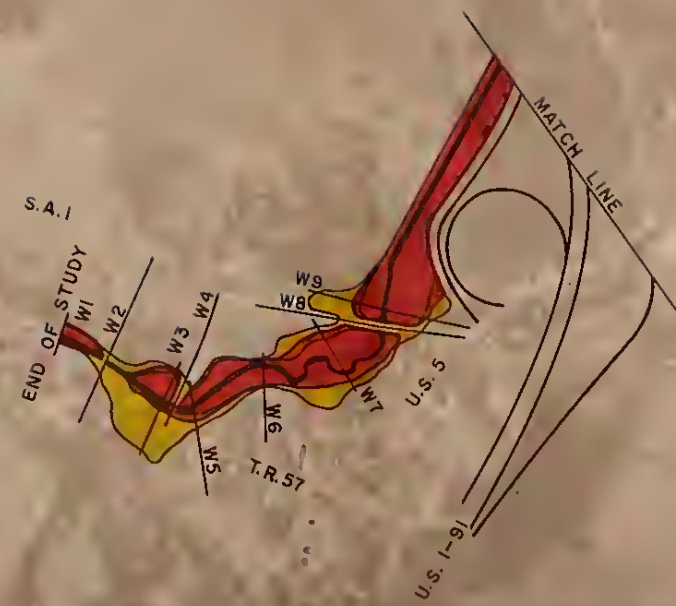
LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND



FLOOD HAZARD AREAS
MILLER RUN
LYNOOS, VERMONT
JANUARY 1973
SHEET 9 OF 10
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



Semi-controlled mosaic prepared
from State of Vermont aerial
photography (VT-62-H) flown May 13, 1962

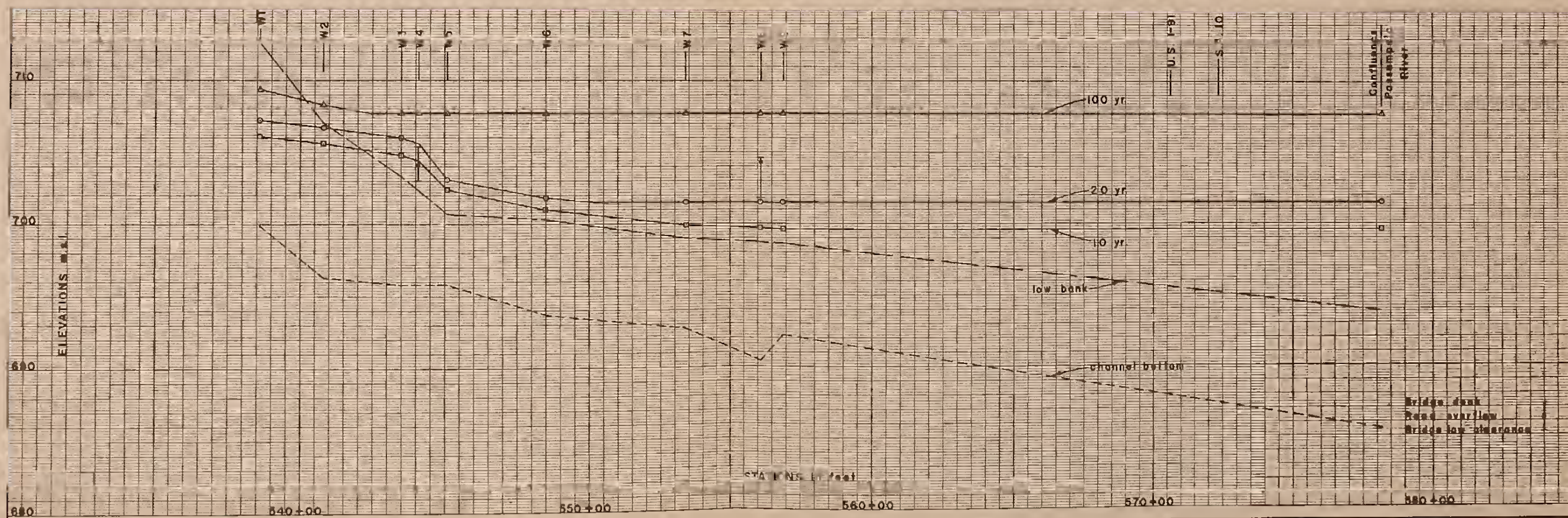


- LEGEND**
- 100 YEAR FLOOD AREA
 - 20 YEAR FLOOD AREA
 - 10 YEAR FLOOD AREA
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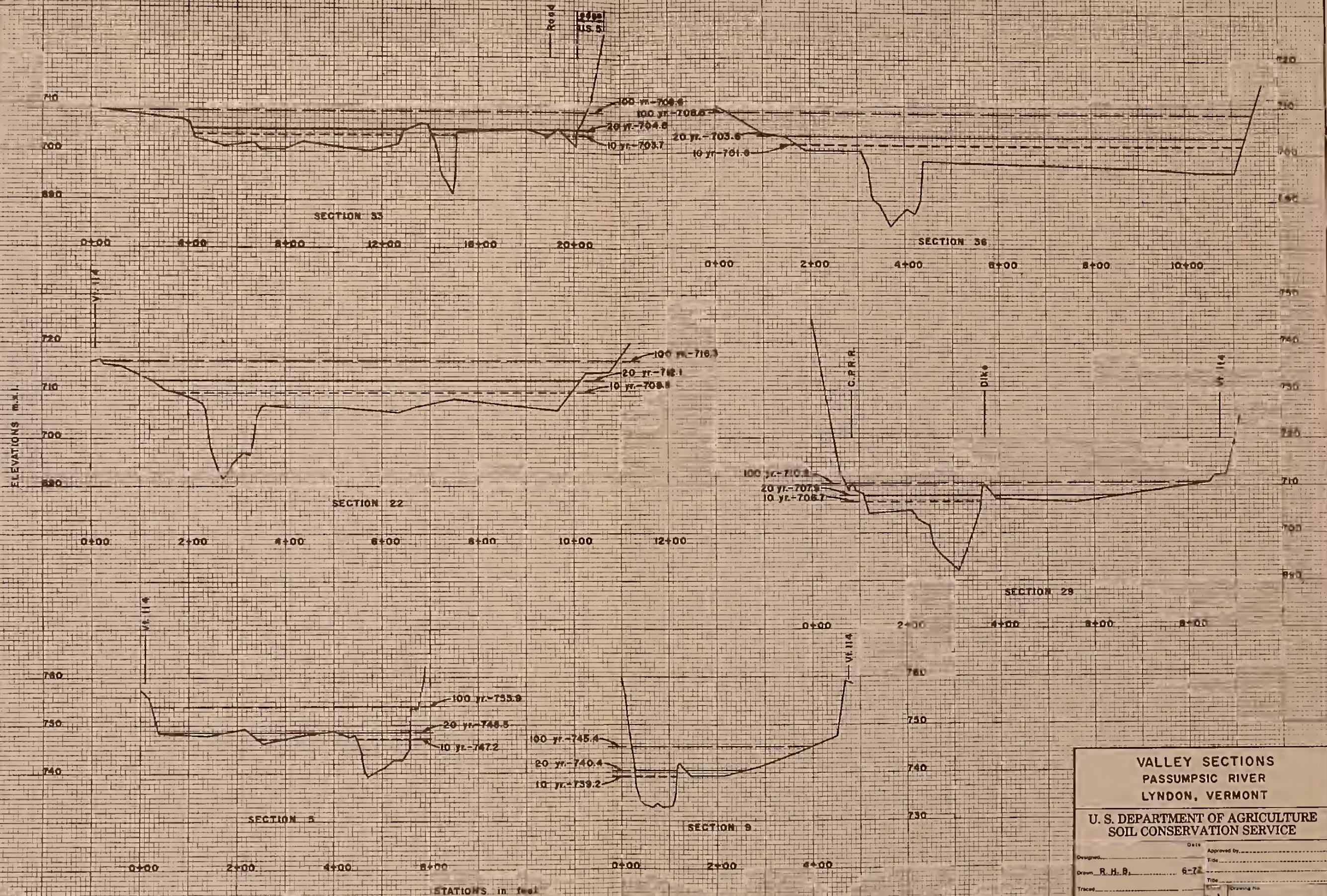
LIMITS OF FLOODING SHOWN MAY VARY
FROM ACTUAL LOCATIONS ON THE GROUND

SCALE 400 0 400 800 1200
APPROXIMATE

FLOOD HAZARD AREAS
SOUTH WHELOCK BRANCH
LYNDON, VERMONT
JANUARY 1973 SHEET 10 OF 10
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE



ELEVATIONS (m.s.l.)



VALLEY SECTIONS PASSUMPSIC RIVER LYNDON, VERMONT	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed by _____	Date _____
Drawn R. H. B.	Approved by _____
Traced _____	Tide _____
Checked _____	Drawing No. _____





